

Äänianalysointilaitteet Optimus Vihreä ympäristömelu ja meluanalysointi

- Mittaamaan painamalla kahta nappia.
- Mittaa aina kaikkia arvoja->selaa vain tulokset.
- Mahdollista itse päivittää tarpeiden mukaan ohjelmapäivityksellä.

Käyttökohteet:

- Työperäisen ja teollisuuden äänen hygieeninen analysointi
- Ympäristömelun painotukset
- Kuulosuojaimien valinta käyttäen HML tai octaavisuotimia
- Tonaalinen analyysi 1:3 octaavisuotimilla
- Äänilahteiden tunnistaminen äänitallenteen avulla
- Melukriteerien ja ääniasetelmien analysointi

Tärkeimmät ominaisuudet

- Optimus Vihreä äänitasomittarit ovat kolmas Optimus äänitasomittarisarjan perhe. Perheitä on viisi
- Äänitasomittarille ovat ominaisia helppo käyttää, ergonomisesti suunniteltu kotelo, korkeatarkkuus näyttö ja 120 dB dynaaminen alue.
- Optimus keltainen mittarissa on OLED värinäyttö!!
- Optimusta Keltainen on saatavana Luokka 1 ja Luokka 2 mittarina.
- Mittaa aina kaikkia parametrejä lisättynä kahdella virtuaalisella melumittarilla. Mittaa automaattisesti myös esim EU ja USA standardin mukaan Dose/LEX vaihtorajat.
- Oktaavisuotimet 1:1 ja 1:3
- 12 havainnollista Ln % arvoa
- VoiceTag mittaustunnistusnäytteen puheäänitus
- Mittausten automaattinen tai manuaalinen toistoohjaus
- Mitattavan äänitason äänen nauhoitus

- Suuri 4GB muisti, johon mahtuu 10 000 mittaustulosta
- Kaikkien parametrien tallennus
- Yhteensopiva Cirrus Research ulkoilmääänitasomittauspakettien kanssa.

Mikrofoni-
kapseli

Esivahvistin

taustavaloilmaisin

Näytön toiminto

Pariston tilan
ilmaisin

Äänitasopalkki

On/Off kytkin

OLED värinäyttö

valikkopainikkeet

Vankka ABS-PC
kotelo

Valaistut
navigointipai-
nikkeet



Optimus Vihreä on Cirrus Researchin uusi äänianalysointisarja, joka perustuu digitaalitekniikkaan ja käyttäjäystävälliseen muotoiluun kuten Optimus Keltainen ja Punainen. Tämä mahdollistaa äänianalysointin tekemisen helppokäyttöiseksi ja monipuoliseksi työkaluksi. Vain käynnistä mittari, kalibroi ja olet jo mittaamassa kaikkea. Optimus Vihreä mittaria voi edelleen päivittää ohjelmistolla monipuolisemmaksi mittariksi kutein muitakin Cirrus Researchin mittalaitteita.

Cirrus Research valmistama Optimus Vihreä äänianalysointilaitte on tarkoitettu ympäristömelumittauksiin ja äänitasojen/melun tarkempaan hygieniseen analysointiin.

Cirrus Research Optimus Vihreä sisältää Ln % arvot, jolla näen kokonaiskuvan melusta äänitutkimuksessa. Optimus Vihreä B versio sisältää 1:3 oktaavimittauksen 6,3Hz - 20kHz kaikissa mittauksissa aikahistorian automaattisella tallennuksella. Sanelunäytteen (VoiceTag) lisäksi mittari pystyy äänittämään melua/ääntä mittauksien aikana. Tämä voidaan käynnistää automaattisesti tai itse erikseen joka kerta. Ääninäyte voidaan äänittää korkealaatuisena tai normaalilaatuisena. Korkealaatuisia voidaan käyttää myöhempää analyysiä varten ja normaali laatu äänilähteen tunnistamista varten. Mittausjaksot voidaan käynnistää automaattisena toistona tai ne voi käynnistää itse erikseen.

NoiceTools Ohjelma.

Monelle käyttäjälle haastavin osa mittausprojektia on tuloksien raportointi ja analysointi. Tästä syystä helppo esilletuonti ja analysointi on ensisijaisen tärkeää. NoiceTools ohjelmassa on panostettu helppouteen erinomaisin tuloksin.

- NoiceTools Ohjelmassa on panostettu raportoinnin ja analysoinnin helppouteen
- Alkuikkuna näyttää yleisemmin tarvittut tiedot mittauksista. Voit tulostaa tämän suoraan!
- Tarkempaa tietoa tarvitsevat löytävät tiedon helposti havainnollisten painikkeiden avulla
- VoiceTag äänitteet voidaan toistaa ohjelmasta oikeiden mittauksien löytämiseksi. näytteet tallentuvat automaattisesti mittauksissa.
- Äänilähteistä tallennetut äänitteet voidaan kuunnella ja jälkianalysoida ohjelmalla.
- Oktaavisuotimilla voidaan laskea tarvittava kuulosuojaus esim kuulosuojaiten listalta.
- Monien mittauksien jälkeen huomaat että tietoa on kertynyt paljon, mittaukset on helppo

organisoida ihmisten, paikkojen ja projektien mukaan.

- NoiceTools päivitykset ovat ladattavissa ilmaiseksi Cirrus Research www-sivuilta.
- NoiceTools ei sisällä lisenssirajoituksia asennettavien tietokoneiden lukumäärästä. Voit asentaa sen niin moneen tietokoneeseen kuin haluat.

mittarin näyttötiloista



Start up screen with instrument type and serial number



Calibration screen



VoiceTag audio recording screen



Sound Level Measurement Screen with Lmax & Lmin



Leq screen with LAeq, t, Peak(C) & C-A values



Leq screen with LAeq, t, Peak(C) & C-A values with the Leq value settled



Leq screen with LAeq, t, Peak(C) and LAE



Real-time octave band screen with graphical display



Real-time octave band screen with numerical display



optimus green Sound Level Meters for Environmental & Occupational Noise Measurements



Applications

Environmental Noise Measurements

- Environmental noise impact assessments over short or long periods
- Environmental noise monitoring outdoors with remote data download over 3G/GPRS & GPS location
- Boundary noise measurements & impact assessments
- Measurements to BS 4142, ISO 1996, Section 61 Notices
- Tonal analysis using to ISO 1996-2:2007 & Cirrus Improved Method
- Detailed analysis using audio recording

Occupational Noise Measurements

- Occupational & Industrial Hygiene Noise Evaluations
- Hearing Protector Selection using HML or 1:1 Octave Band Methods
- Workplace noise measurements to ISO9612

Simple Noise Measurements

- Noise Ordinance & Community Noise Assessments
- General Noise Measurements

Key Features

- Simple operation ensures that you get the functions you need quickly & easily
- Simultaneous measurement & data logging of all available parameters
- Simultaneous A, C & Z Frequency Weightings
- Simultaneous F, S & I Time Weightings
- Real-time 1:1 & 1:3 Octave Band Filters
- NR & NC values & curves on screen*
- Tonal noise analysis*
- Up to 28 statistical Ln % values*
- Single 120dB measurement range
- Acoustic Fingerprint™ audio triggering, recording & alerts during measurements for replay and analysis
- VoiceTag™ audio note recording
- AuditStore™ measurement verification
- Repeating measurements with manual or automatic control
- Pause & Back Erase functions
- High resolution colour OLED display and back-lit keypad for night-time measurements
- 4GB memory capable of storing over 10,000 measurements (expandable up to 32GB)
- Compatible with CK:670 & CK:680 outdoor noise measurement kits
- Measure up to 170dB with the optional MV:200EH microphone system

Measure everything. Forget nothing.

The **optimus green** sound level meters have been designed with ease of use as the most important feature which lets you get on with measuring and controlling the noise.

The instruments use the very latest in digital technology and industrial design techniques to make everything as clear and simple as possible. All of the functions of the instrument are measured at the same time so there's no risk of choosing the wrong setting, and with a wide 120dB measurement span you don't need to worry about choosing the right range.

Featuring a high resolution colour OLED screen and a keypad which will illuminate automatically in low light, the optimus instruments are ideal for any noise application. The measurement data is displayed in a clear and simple format along with a real-time noise chart so that you can see how the noise varies with time.

A standard optimus can measure up to 140dB(A) and 143dB(C) Peak with the standard microphone and preamplifier, and up to 170dB using the optional MV:200EH High Level Noise microphone system.

The ideal solution for environmental & occupational noise

The **optimus green** sound level meters are ideal instruments for both environmental & occupational noise and will give you all of the information you need, right at your finger tips.

Every measurement contains all of the available functions so there's no risk of selecting the wrong parameter or function.

Environmental Noise Measurements

For environmental noise applications, an **optimus green** is the ideal instrument.

Comprehensive measurement capability

The overall L_{eq} , L_{max} and statistical $L_{n\%}$ values are measured along with a range of noise profiles providing a complete picture of the noise under investigation.

Real-time 1:3 Octave Bands

The B & C variants will measure and store Real-Time 1:3 octave bands from 6.3Hz to 20kHz throughout each and every measurement, with the overall value along with a time history stored automatically.

Acoustic Fingerprint triggers and audio recording

As well as the VoiceTag recording, the **optimus green** instruments provide audio recording during measurements using the Acoustic Fingerprint technology.

Recordings can be started either manually or automatically when user defined triggers are activated.

Audio recordings can be stored either as Studio 96/32 quality which can be used for later analysis, or as Standard 16/16 quality which can be used for replay and source identification.

Tonal noise detection

The D variants use either the ISO 1996-2:2007 Simplified Method or the Cirrus improved method to highlight tonal noise in 1:3 octave bands.

Repeating measurements

Measurements can be either started manually or automatically by the measurement control functions.

This allows the instruments to make repeated measurements over long periods of time, ideal when the instrument is used with an outdoor noise measurement kit.

Occupational Noise & Industrial Hygiene Measurements

As well as the environmental noise functions, the **optimus green** instruments also provide a complete range of occupational noise functions.

UK & EU Noise at Work Regulations

If you are working to the UK Control of Noise at Work Regulations or the EU Physical Agents (Noise) Directive, L_{Aeq} and L_{Cpeak} values are measured at the same time which allow the $L_{EP,d}$ ($L_{EX,8h}$) and the Peak Action Levels to be determined. The exposure calculator also



displays a projected $L_{EP,d}$ ($L_{EX,8h}$) for the current measurement.

The $L_{Ceq}-L_{Aeq}$ (C-A) value is also measured which can be used to select PPE using the HML method.

OSHA, MSHA & other regulations

If you need to meet regulations such as OSHA HC & NC, MSHA HC or ACGIH, the two "virtual" noise meters in the Dose View can be quickly configured to provide you with this information.

Octave Band Filters for Noise Control & Selecting Hearing Protection

The **optimus green** A, B & C variants also feature real-time 1:1 octave band filters which can be used to aid in the selection of PPE and for noise control applications.

NR & NC curves & values are shown on screen after a measurement.

NoiseTools Software

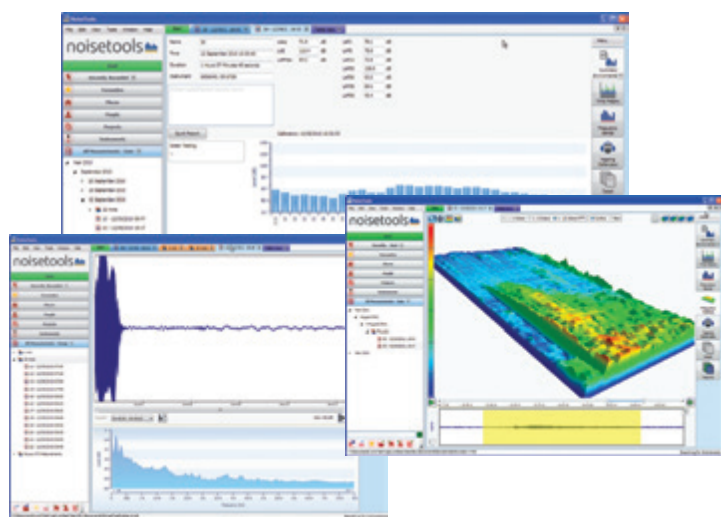
The NoiseTools software package gives you a quick and simple way to download, analyse and report your noise measurement information.

The initial summary screen shows you the most commonly used information and, through simple icons, gives you access to the detailed measurement data. For advanced users, each and every function measured by the instrument is available for review and analysis and the data can be exported for further use.

VoiceTag audio recordings can be played back for reference and are automatically stored with the measurement data, and audio recordings can be replayed and analysed in 1:12 Octave Bands.

To help you keep your noise measurement data organised and easy to find, NoiseTools allows each measurement to be allocated to people, places and projects.

NoiseTools is supplied free from any licensing restrictions or limits allowing you to install the program on as many PC's as needed at no additional cost.



Outdoor Measurement Kits

Where there is a need to measure noise levels outdoor or over long periods, the **optimus green** sound level meters can be used with the CK:670 and CK:680 outdoor measurement kits.

These kits comprise a weatherproof case which contains the instrument and battery pack(s) along with an interface to external power and USB. The kits also include the MK:170 outdoor microphone which provides weather protection for the microphone capsule and connects via a 10m cable to the main enclosure.

The CK:680 also contains a 3G/GPRS modem and GPS location receiver which allows the noise measurement data to be downloaded remotely to the NoiseTools software via the Optimus Cloud system.

When used with a single battery pack, the CK:670 can power the instrument for 7 days whereas the CK:680 can provide power for 6 days. Adding a further battery pack doubles the operating life and external power can be added if required.

Datasheets for the CK:670 and CK:680 contain additional details about these two systems and can be downloaded from the Cirrus website at www.cirrusresearch.co.uk/library

AuditStore data verification

AuditStore™ is a new technology that helps you to ensure that your noise measurement data is valid and trustworthy. AuditStore allows the user to verify measurements that have been downloaded to the NoiseTools software against a secure data store within the instrument.

AuditStore™
Data verification for your noise measurements

Each time you make a measurement with your optimus, a selection of the overall data is stored into a separate, secure memory that is independent of the main memory card.

This data contains essential information about the measurement such as the time, date and duration, the L_{Aeq} , Peak(C) and L_{AFmax} , L_{A10} & L_{A90} (where available) and the overload indication.

In addition to the noise measurement data, information about the last calibration is also stored.

The AuditStore data can be downloaded from the instrument when required and then the measurements can be checked against the AuditStore.

The NoiseTools software will check that the measurement information held in the main database and displayed on the screen matches the values within the AuditStore secure memory.

NoiseTools will display verification symbols if the information matches, a unique feature which will be useful in any legal proceedings.



CK:670 Outdoor Kit shown with optional CT:7 Tripod

Standard measurement kits

Complete measurement kits are available for the optimus instruments which contain the sound level meter, an acoustic calibrator, windshield, cables, batteries and accessories. The measurement kits contain all of the accessories needed to carry out a noise survey.

Details of the measurement kits are shown on the back of this datasheet.

Specifications

Applicable Standards
IEC 61672-1:2002 Class 1 or Class 2 Group X
IEC 60651:2001 Type 1 I or Type 2 I
IEC 60804:2000 Type 1 or Type 2
IEC 61252:1993 Personal Sound Exposure Meters
ANSI S1.4 -1983 (R2006), ANSI S1.43 - 1997 (R2007)
ANSI S1.25:1991
1:1 & 1:3 Octave Band Filters to IEC 61260 & ANSI S1.11-2004

Microphone
Class 1 Instruments MK:224 pre-polarized
Class 2 Instruments MK:216 pre-polarized

Microphone Preamplifier
MV:200 Removable Preamplifier

Total Measurement Range:
20dB to 140dB RMS Single Range
Noise Floor: <18dB(A) Class 1, <21dB(A) Class 2

Frequency Weightings
RMS & Peak : A, C, & Z Measured Simultaneously
1:1 Octave Bands:
31.5Hz to 16kHz
1:3 Octave Bands:
6.3Hz to 20kHz (Bands from 12.5Hz displayed,
6.3Hz, 8Hz & 10Hz stored & downloaded) - B & C variants
Additional Metrics:
L_{Aeq} L_f (20Hz to 200Hz) & L_{eq} L_f (20Hz to 200Hz)

Time Weightings
Fast, Slow & Impulse Measured Simultaneously

Display
High resolution OLED display.
Ambient light sensor & illuminated keypad

Memory
4GB (32GB factory fit option)

AuditStore
Measurement verification data stored in secure memory

Time History Data Rates (Global settings)
10ms, 62.5ms, 125ms, 250ms, 1/2 sec, 1 sec, 2 sec (User selectable)

VoiceTag Audio Recording
Up to 30 seconds of audio notes with each measurement

Acoustic Fingerprint Audio Recording
Off, Manual, Threshold Triggered, Advanced Trigger
User options:
Studio Quality - 96kHz/32bit WAV format
Standard quality - 16kHz/16bit WAV format
Pre-Trigger function

Integrators
Three simultaneous "virtual" noise meters. Integrator 1 is preset to Q3 for Leq functions. Integrators 2 & 3 can be configured with the following:
Exchange Rate: 3, 4 or 5 dB
Threshold: 70dB to 120dB (1 dB steps)
Time Weighting:None or Slow
Criterion Level: 70dB to 120dB (1 dB steps)
Criterion Time: 1 to 12 hours in 1 hour steps

Integrator Quick settings
EU, OSHA HC & OSHA NC, OSHA HC & ACGIH, MSHA HC & MSHA EC, Custom 1 & Custom 2

Ln Statistical Values
14 independent statistical Ln values calculated from 1/16th L_{Af}
7 preset to L1.0, L5.0, L10.0, L50.0, L90.0, L95.0 & L99.0
7 user defined Ln values
CR:172C & CR:171C allow for an additional 14 Ln values with independent time and frequency weighting.

Measurement Control
Measurement control with user selectable duration of manual, 1 min, 5 min, 10 min, 15 min, 30 mins, 1 hour, Lden
Automatic Synchronisation & Repeat
Pause
Back Erase with user selectable duration

Dimensions
Size: 283mm x 65mm x 30mm
Weight: 300gms/10oz

Batteries
4 x AA Alkaline

Battery life
Typically 12 hours with Alkaline AA
Typically 20 hours with Lithium AA Non-Rechargeable
Battery life is dependent upon the battery type and quality & screen brightness

Connections
USB Type B to PC
AC & DC Output via ZL:174 (2 x Phono, 1m)
Multi-pin IO for external power via ZL:171 cable (2.1mm socket)
External Power: 5v-15v via MultiIO socket via ZL:171 cable (2.1mm socket)

Tripod Mount
1/4" Whitworth socket

Case
Material: High Impact ABS-PC with soft touch back & keypad

Environmental
Temperature: Operating -10°C to +50°C,
Storage -20°C to +60°C
Humidity: Up to 95% RH Non Condensing

Electromagnetic performance
IEC 61672-1:2002 & IEC 61672-2:2003
Except where modified by EN 61000-6-1:2007 & EN 61000-6-2:2007

Language options
English, French, German, Spanish as standard
Other language options may be available

Software Support
NoiseTools Download, Configuration & Analysis software supplied as standard. Compatible with Microsoft Windows XP, Vista, 7 & 8 (32bit & 64bit)

Measurement Functions¹

CR:1720 & CR:1710
L_{XfY}, L_{XYMax}, L_{XYMin}
L_{Xeq}, L_{CPeak}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{Ceq}, L_{Aeq}, L_{XE}, L_{ALeq}
Graph of Short L_{Aeq}, L_{CPeak}
Measurement Run Time
Integrators 2 & 3: TWA, Dose %, Est Dose %
14 Statistical Ln% Values
Stored Functions
L_{XYMax} & Time History of L_{XYMax}
L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{ALeq}
Time History of L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{ALeq}
Integrators 2 & 3: L_{AVG}, TWA, % Dose
Time History of L_{AVG}
Ln Values: 14 independent statistical values
Audio recording during measurement
Time, date & duration of measurement

CR:172A & CR:171A
L_{XfY}, L_{XYMax}, L_{XYMin}
L_{Xeq}, L_{CPeak}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{Ceq}, L_{Aeq}, L_{XE}, L_{ALeq}
Graph of Short L_{Aeq}, L_{CPeak}
Measurement Run Time
Integrators 2 & 3: TWA, Dose %, Est Dose %
Real-Time 1:1 Octave Bands (Graphical & Numeric)
NR & NC values & curves
14 Statistical Ln% Values
Stored Functions
L_{XYMax} & Time History of L_{XYMax}
L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{ALeq}
Time History of L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{ALeq}
Integrators 2 & 3: L_{AVG}, TWA, % Dose
Time History of L_{AVG}
1:1 Octave Bands: Overall L_{eq} & L_{eq} Time History for each band, NR & NC values & curves
Ln Values: 14 independent statistical values
Audio recording during measurement
Time, date & duration of measurement

CR:172B & CR:171B
L_{XfY}, L_{XYMax}, L_{XYMin}
L_{Xeq}, L_{CPeak}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{Ceq}, L_{Aeq}, L_{XE}, L_{ALeq}
Graph of Short L_{Aeq}, L_{CPeak}
Measurement Run Time
Integrators 2 & 3: TWA, Dose %, Est Dose %
Real-Time 1:1 Octave Bands (Graphical & Numeric)
Real-Time 1:3 Octave Bands (Graphical & Numeric)
NR & NC values & curves
L_{eq} L_f (20Hz to 200Hz)
14 Statistical Ln% Values
Stored Functions
L_{XYMax} & Time History of L_{XYMax}
L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{ALeq}
Time History of Short L_{Aeq}, L_{CPeak}
Integrators 2 & 3: L_{AVG}, TWA, % Dose
Time History of L_{AVG}
1:1 & 1:3 Octave Bands: Overall L_{eq} & L_{eq} Time History for each band
NR & NC values & curves
Ln Values: 14 independent statistical values
Audio recording during measurement
Time, date & duration of measurement

CR:172C & CR:171C
L_{XfY}, L_{XYMax}, L_{XYMin}
L_{Xeq}, L_{CPeak}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{Ceq}, L_{Aeq}, L_{XE}, L_{ALeq}
Graph of Short L_{Aeq}, L_{CPeak}
Measurement Run Time
Integrators 2 & 3: TWA, Dose %, Est Dose %
Real-Time 1:1 Octave Bands (Graphical & Numeric)
Real-Time 1:3 Octave Bands (Graphical & Numeric)
Tonal Noise Detection in 1:3 Octave Bands
NR & NC values & curves
L_{eq} L_f (20Hz to 200Hz)
Up to 28 Statistical Ln% Values
Stored Functions
L_{XYMax} & Time History of L_{XYMax}
L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{ALeq}
Time History of L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{ALeq}
Integrators 2 & 3: L_{AVG}, TWA, % Dose
Time History of L_{AVG}
1:1 & 1:3 Octave Bands: Overall L_{eq} & L_{eq} Time History for each band
Tonal Noise Detection in 1:3 Octave Bands
NR & NC values & curves
Ln Values: 28 independent statistical values
Audio recording during measurement
Time, date & duration of measurement

where x=A, C, Z; y= F, S, I

Other functions may be calculated by the NoiseTools software and displayed on download.

Notes
1. For details of the displayed and stored parameters, please refer to the optimum user manual.

All specifications, features and values are typical and are subject to change without notice.

Instrument Selection

Function/Instrument	Class 1	Class 2	Type Approval	Sound Level Functions	Leq/Peak Functions	TWA/ Dose Functions	Data Logging	Pause & Back Erase	AuditStore	Acoustic Fingerprint Audio Recording	VoiceTag Note Recording	1:1 Octave Band Filters	1:3 Octave Band Filters	NR & NC Curves on screen	Tonal Noise Detection	Ln values	Software Support	3G/GPRS Modem & GPS Support	Measurement Kit
CR:1720		✓		✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓	CK:1720
CR:1710	✓		PTB,LNE Applus+	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓	CK:1710
CR:172A		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	CK:172A
CR:171A	✓		PTB,LNE Applus+	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	CK:171A
CR:172B		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	CK:172B
CR:171B	✓		PTB,LNE Applus+	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	CK:171B
CR:172C		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	CK:172C
CR:171C	✓		PTB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	CK:171C

Standard Accessories
The **optimus** sound level meters are supplied, as standard, with the following accessories:
User Manual
Certificate of Calibration
USB Data/Power Cable

Windshield
NoiseTools Software CD

Measurement Kits
The **optimus** sound level meters are available as a complete measurement kit with the following accessories:
optimus Sound Level Meter
CR:514 Class 2 or CR:515 Class 1 Acoustic

Calibrator
UA:237 90mm Windshield
CK:300 Carrying Case
User Manual & Certificates of Calibration
USB Data/Power Cable & NoiseTools Software CD



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